Small Towers

The problem

Small towers serve small to medium airfields all around the world. They are generally not big in size, but the number of airports needing small to medium installations is high and represent one of the biggest problems for Airport Management Authorities and Air Navigation Service Providers (ANSP), especially when it comes to the need of modernisation and technological turnover.

Area Control Centres (ACC) and big airports implement large systems that do normally not fit into the facilities of smaller airports. It is not just a matter of space and size, but also of systems dimensioning and costs. Not to forget logistic issues, especially when towers are hosted in old buildings with narrow stairs and limited physical access possibilities.

Small towers employ a limited number of controllers, thus not requiring all the complex solutions and interconnections that are normally in place in large towers with bigger space and the capability of housing a higher number of equipment and controllers.

In addition, there is the need to ensure and further enhance the situational awareness of tower controllers, by giving them full and handy access to all tools needed in a modern tower. This often results in having a lot of screens and tools and keyboards on their desks, thus making it difficult to have an effective and prompt management of the airfield, thus limiting runway surveillance and traffic management.

SITTI Solution

SITTI is a global player in the Air Traffic Control (ATC) market, capable of providing smart solutions for small airfields as well as large Area Control Centres (ACC). In the many decades of proactive presence in the ATC field, SITTI has identified a set of integrated features that fit to small/ medium airport towers.

This brought to a standardised modular turn-key proposal that can be considered as the best solution on the market when it comes to the need of upgrading and modernising small to medium airfield towers, for 24/7/365 usage with no interruption.

The solution proposed by SITTI is made of the following independent areas of intervention:

- **VOICE COMMUNICATION SYSTEM (VCS)**
- **CONTROLLER WORKING CONSOLES**
- **INFORMATION INTEGRATION**

Voice Communication System

SITTI boasts a long-term presence in the ATC market that allowed to acquire a very detailed knowledge of the communication needs at tower level. This, combined with the active participation in international standardization Working Groups, enabled SITTI to develop a family of top-edge VOIP Voice Communication Systems (VCS), named MULTIFONO® M800IP®, to be used in airport towers.

The M800IP® VCS family represents the most advanced state-of-the-art Voice-Over-IP (VoIP) system, fully meeting EUROCAE ED137 standard requirements, by integrating the most advanced features and technology, coupled with user-friendliness and easy maintenance, thanks to its non-blocking, modular and scalable architecture. This makes it the best solution for mission-critical applications, even in the military context.

Digital, analogue, legacy non-IP and VoIP interfaces are natively integrated into one system, thus providing an all-in-one solution. The proposed M800IP® solution includes a number of intelligent terminations, capable of converting non-VOIP, non-standard, even non-digital connections into ED137 standard compliant links. Its open architecture design ensures an extremely high level of modularity, scalability, reliability and process distribution, without any single-point-of-failure (fault tolerant operations).

The M800IP® solution allows any kind of seamless expansion by simply adding/replacing interface cards. This permits customers to start with a basic set of features that can be expanded and integrated as long as new needs are identified. In many cases, such an upgrade does not require

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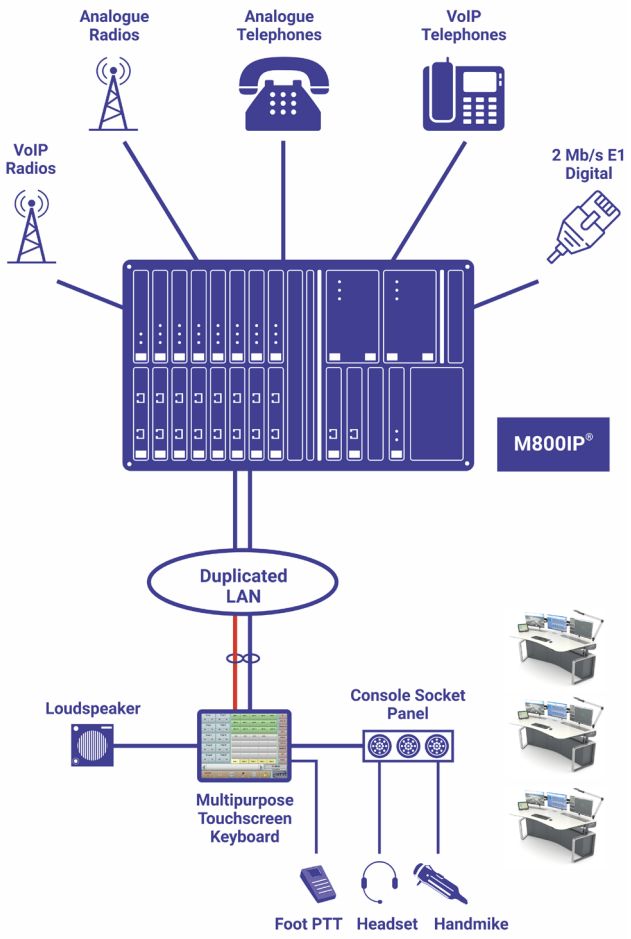
any hardware change nor software upgrade: it might only be limited to system reconfiguration.

As an option, SITTI can also provide analogue, digital or VoIP legal recording by means of a Voice Recording System (VRS), capable of also recording ambient noise, cameras and radar screens with advanced playback features. VoIP recording is in compliance with EUROCAE ED137 for both radio and telephone recording purposes.

A small tower requires access to a limited number of telephone lines and radio links. SITTI is therefore proposing a compact yet flexible VCS solution, specifically thought for the use in small to medium size towers. The following picture shows the general architecture of such a solution.

// Standard features

Best Signal Selection	Automatic detection of the best received radio signal
Delay Compensation	Especially with satellite and non-satellite links
Echo Suppression	Better audio understanding
Multi-Site radio management	When multiple radios on the same frequency are placed at different sites



All telephone and radio interfaces are contained in a single drawer with duplicated power supply, providing access to:

- 4 analogue radios
- 4 analogue telephone lines
- 2 VoIP radios
- 2 VoIP telephone trunks
- 1 digital 2Mb/s E1 trunk
- 4 controller positions (CWP)

Analogue and VoIP radios are connected to the system through a board that can be used for both analogue and VoIP interfacing modes. In this way, customers can initially link legacy analogue radios, but being already prepared to move to VoIP when IP radios will be installed, without extra costs.

Possible existing VoIP communication infrastructure and switchboards can be directly connected to the drawer, thus offering controllers full access to VoIP telephone trunks. The proposed system comes along with its own supervision software (running on an ordinary computer) for configuration and monitoring purpose. Diagnostics, statistics, resource allocation, CWP setup, access control are also included.

Controller Working Positions (CWP) are connected via duplicated LANs (copper line or fiber optic) to guarantee their availability even in case of network interruption. From their position, controllers can access all radio and telephone facilities provided by the system. All features available in larger systems are also available here, with no limitation.

The solution depicted here above is just an example of what SITTI is capable of offering. This solution is compact, easy to maintain, seamlessly expandable without affecting ongoing operations. At any moment in time, new boards and even drawers can be added to meet new and evolving customer needs.

Small Towers

Customized Consoles

Small towers have the need of allocating space to a limited number of controllers and their flight control devices in buildings where space may often be a critical issue. SITTI is worldwide known not only for its top level VCS systems, but also for the care it puts in the development of Controller Working Consoles.

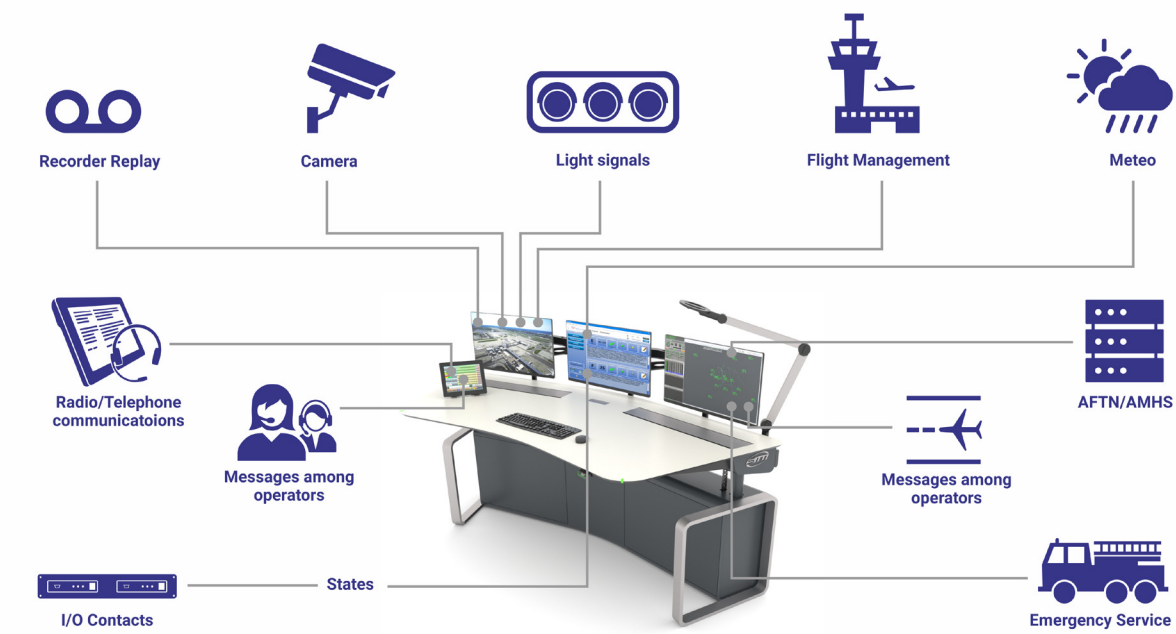
These latter, in fact, are an important add-on to communications for operators. SITTI consoles combine important aspects that allow operators to do their job in the best, effective and efficient way, by taking into consideration the characteristics listed in the following table.

Characteristic	Target
Flexibility	Evolving requirements and equipment expansion
Efficient Integration	Space optimization and ease of installation
User Friendliness	Ease of access to displays and radio/telephone communication equipment
Ergonomic and Comfort Factors	Minimization of stress and discomfort over long usage periods
Suitable Materials	Long lasting workplace, easy to maintain and to clean, optimal comfort
Operational Health Protection	Avoidance of health dangers and granting of a safe environment
Elegance	Innovative modern design, because beauty is also important

The many decades of successful presence in the market of Voice Communication Systems confirms SITTI as one of the world primary system suppliers for civil, military, public and private agencies. The long experience accumulated in this field puts SITTI in the enviable position of being able to design and manufacture different models of consoles that are customized for specific uses, ranging from Airport Towers to large Air Traffic Control centers.

The growth of air traffic over recent years has dramatically increased the workload for controllers that must be put in the best condition to properly cope with their tasks in the most comfortable way possible. In this perspective, an optimized synergy must be sought between high-level ergonomics, efficient and effective access to technology, environmental conditions.

The leading position of SITTI in technology would be vanished if its usage by end users (the controllers) is not easy and comfortable. Special attention is paid to providing operators with the best choice in terms of used materials and adjustable seats, not forgetting optimal lighting and appropriate positioning of communication elements (keyboards, earphones, etc.). Flexible hardware and software design approach, modular components, specific hardware and software solutions, all contribute to the common goal of providing Customers with the most advanced, yet friendly consoles. This results in a higher efficiency of the operators who will get the best from the touch and feel approach of the console design.



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Information Integration

Air Traffic Control working positions (CWP) are often overcrowded with monitors and ancillary equipment that make the work of controllers cumbersome and prone to confusion and error. In many cases, controllers have to deal with several different applications, each requiring its own display and interaction system:

- Radio/Telephone Communications
- Interconsole Messaging
- Meteo Information
- NOTAM/SNOWTAM
- Electronic Strips
- Video Cameras
- AFTN/AMHS
- Runway Lights
- Recorders
- Flight Plans Management
- … et cetera …

The long experience of SITTI made it possible to formulate a solution proposal for the concentration of such different data sources into one integrated product that reduces the number of objects on the controller working position. Information can be arranged in configurable desktops, each dealing with different management aspects, according to the Customer needs.

Flexibility in the integration methods of any third party application permits the Customer to include a large variety of functions into a common desktop that simplifies the access and use of the systems features, by also providing user credentials management and logging.

// Key Evaluation Aspects

- 24/7/365 Operational Service
- Non-Blocking, Very High System Performance
- Open Architecture, Highest Level of Modularity
- Duplicated, independent, parallel operations
- ED137 VoIP standard compliance
- VoIP linked CWPs in “star” configuration
- Fault tolerant operations
  No SPOF (Single Point of Failure)
- Reliability 99.9999%
- CWP access to Telephone lines and Radio frequencies through analogue, digital and VoIP interfaces
- Embedded Intercom between local and remote CWPs
- Support of standard and legacy protocols
- Software upgrade by direct upload without manual intervention and without affecting operations of other parts of the system
- Touch screen terminals with user-friendly graphic interface and ancillary ATC applications
- Black/Red Military applications
- Seamless expandability without affecting ongoing operations
- Gateways for legacy non-IP links
  - Best Signal Selection (BSS)/Multi-Site Voting
  - Delay compensation
  - Echo suppression
  - Automatic new radio search in case of failure
  - Legacy protocols from different radio manufacturers
  - SNMP radio management

Configurable desktop according to the Customer need